

U.S. Patent Application Serial No. 10/665,204
Amendment filed April 17, 2007
Reply to OA dated January 18, 2007

REMARKS

Claims 1 - 16 and 22 are canceled in this patent application.

Claims 17 and 23 have been amended, and claims 24 and 25 have been added in order to more particularly point out, and distinctly claim the subject matter to which the applicants regard as their invention. The applicants respectfully submit that no new matter has been added. It is believed that this Amendment is fully responsive to the Office Action dated January 18, 2007.

Claims 17 - 21 and 23 - 25 are currently pending in this patent application, claims 17 and 23 being independent claims.

Claims 17 and 23 are rejected under 35 USC §112, second paragraph, for the specific reason set forth in item 2, page 2 of the outstanding Action. The applicants respectfully request reconsideration of this rejection.

As indicated above, claims 17 and 23 have been amended in order to more particularly point out, and distinctly claim the subject matter to which the applicants regard as their invention, and in order to correct certain informalities therein, including those pointed out by the Examiner.

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Accordingly, the withdrawal of the outstanding indefiniteness rejection under 35 USC §112, second paragraph, is in order, and is therefore respectfully solicited.

As to the merits of this case, the applicants thank the Examiner for now withdrawing his previous reliance on the applicants' "admitted prior art" (APA), Takahashi (JP59-161082), Fujimura (U.S. Patent Publication No. 2002/0149827), Vilela (U.S. Patent No. 5,800,630), and Watanabe (JP6-90016).

However, the Examiner now relies on a new reference (namely, Matsuoka (U.S. Patent No. 5,557,117)) in rejecting the claims as discussed more fully below.

Claims 17 - 19, and 21 - 23 are rejected under 35 USC §102(b) as being anticipated by Matsuoka. The applicants respectfully request reconsideration of these rejections.

A significant claimed structural arrangement of the applicants' claimed semiconductor light-receiving device for a high-speed and large-capacity optical fiber communication system, as now recited in each of independent claims 17 and 23, includes the high-concentration semiconductor intermediate tunneling layer and the buffer layer being made of an identical material.

Such significant claimed structural arrangement, as now recited in each of claims 17 and 23, is supported in the applicants' original specification. For instance, the first embodiment of the invention disclosed in the original specification employs an NInP buffer layer 13 and an N⁺InP semiconductor intermediate layer 31. What is significant is that the claimed buffer layer 13 and the claimed semiconductor intermediate layer 31 are of an "identical" material, and their impurity concentrations do not matter.

On the other hand, Matsuoka teaches, in Figure 2 therein and the description thereof, an n-type InP layer 3a, an n-type InGaAs layer 4a, and an undoped InGaAs layer 5a. The Examiner has taken the position that the layers 3a, 4a, 5a correspond to the applicants' buffer layer, tunneling layer, and light absorption layer, respectively. However, the layers 3a, 4a are not made of an identical material, but of different materials. Matsuoka does not teach nor suggest that the high-concentration semiconductor intermediate tunneling layer and the buffer layer are made of an identical material, as now recited in each of independent claims 17 and 23.

In view of the above, not all of the claimed elements, as now recited in each of independent claims 17 and 23, are found in exactly the same situation and united in the same way to perform the identical function in Matsuoka. Thus, there can be no anticipation under 35 USC §102(b) based on Matsuoka.

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Furthermore, claims 18, 19 and 21 depend on claim 17, and further limit the scope of claim 17. Thus, at least for the reasons discussed above with respect to claim 17, claims 18, 19 and 21 should now be similarly allowable.

Alternatively, as to claims 18 and 19, the Examiner alleges that the applicants' specification contains no disclosure of either the critical nature of the claimed arrangement or any unexpected results arising therefrom, and where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the applicants must show that the chosen dimensions are critical.

The Examiner is respectfully referred to the applicants' specification at page 13, line 25 through page 14, line 5 where the importance of the claimed impurity concentration is taught.

Also, claim 22 has been canceled, without prejudice or disclaimer. Thus, the rejection of claim 22 is now moot.

In view of the above, the withdrawal of the outstanding anticipation rejection under 35 USC §102(b) based on Matsuoka is in order, and is therefore respectfully solicited.

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Moreover, claims 17, 19 and 20 are rejected under 35 USC. §103(a) as being unpatentable over Ajisawa (U.S. Patent No. 5,825,047) in view of Buchanan (U.S. Published Application No. 2003/0211648). The applicants respectfully request reconsideration of this rejection.

The Examiner states that the layers 64, 65 of Ajisawa correspond to the applicants' buffer layer and semiconductor intermediate layer, respectively. However, the layer 64 is an InGaAsP layer, and the layer 65 is an InP layer as described in column 6 in Ajisawa. Thus, even if the teachings of cited references may be combined in the manner suggested by the Examiner, such combined teachings would still fall far short in fully meeting the applicants' claimed invention, as now set forth in amended independent claim 17, and claims 19 and 20 which depend from claim 17.

Alternatively, the Examiner has taken the position that Ajisawa discloses in Figure 6 thereof a semiconductor light-receiving device having a semi-insulating substrate; a buffer layer 64 of the first conduction type; a light absorption layer 66; a semiconductor layer of a second conduction type 67; and a semiconductor intermediate layer 65 of the first conduction type that is interposed between the buffer layer and the light absorption layer. However, this cited prior art does not teach the claimed semiconductor layer of a first conduction type that is formed on the semi-insulating substrate, and the claimed semiconductor intermediate layer having a higher impurity concentration than the buffer layer.

The Examiner has further taken the position that Buchanan discloses in Figure 7 thereof a semiconductor light-receiving device comprising: a semi-insulating substrate (1); a semiconductor layer (5) of a first conduction type; a buffer layer (4g) of the first conduction type; a light absorption layer (4e) that is formed on the buffer layer; a semiconductor layer of a second conduction type (3); a high-concentration semiconductor intermediate tunneling layer (4f) of the first conduction type that is interposed between the buffer layer and the light absorption layer having a higher impurity concentration than the buffer layer and a thickness and impurity concentration within the recited range of claim 19.

In Buchanan's Figure 7, however, the alleged tunneling layer (4f) is shown to have an impurity concentration of 3×10^{18} to 10^{19} cm^{-3} , which does not include the claimed impurity concentration of 2×10^{18} . On this basis, the applicants traverse the rejection of claim 19.

In view of the above, even if *arguendo* the teachings of the cited references are combined in the manner suggested by the Examiner, such combined teachings would still fall far short in fully meeting the applicants' claimed invention, as now recited in claims 17, 19 and 20. Thus, a person of ordinary skill in the art would not have found the applicants' claimed invention obvious under 35 USC. §103(a) based on the teachings of Ajisawa and Buchanan, singly or in combination.

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Accordingly, the withdrawal of the outstanding obviousness rejection under 35 USC. §103(a) as being unpatentable over Ajisawa (U.S. Patent No. 5,825,047) in view of Buchanan (U.S. Published Application No. 2003/0211648) is in order, and is therefore respectfully solicited.

In view of the aforementioned amendments and accompanying remarks, claims, as amended, are in condition for allowance, which action, at an early date, is requested.

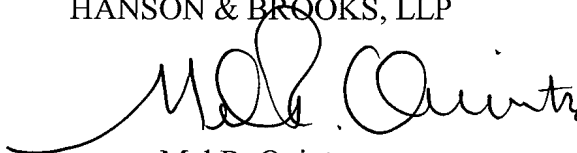
If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact the applicants' undersigned attorney at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

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In the event that this paper is not timely filed, the applicants respectfully petition for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper to Deposit Account No. 01-2340.

Respectfully submitted,

ARMSTRONG, KRATZ, QUINTOS,
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A handwritten signature in black ink, appearing to read 'Mel R. Quintos', is written over the printed name and firm name.

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